

ASYNCHRONOUS DISPLAY TERMINAL MARKET

VOLUME II: INTERMEDIARIES' REQUIREMENTS

INPUT



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Intermediaries' Requirements for  
Asynchronous Display Terminals

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Planning Services for Management

ASYNCHRONOUS DISPLAY TERMINAL MARKET

VOLUME II:

INTERMEDIARIES' REQUIREMENTS FOR  
ASYNCHRONOUS DISPLAY TERMINALS

Prepared For:

INTERNATIONAL BUSINESS MACHINES CORPORATION  
SYSTEMS COMMUNICATION DIVISION

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# ASYNCHRONOUS DISPLAY TERMINAL MARKET

(Volume I and Volume 2)

The objective of this study was to determine the size and growth of the ASCII asynchronous display terminal market. Leading vendors and distributing intermediaries were interviewed to determine market size and trends.

The report has been published in two volumes: Asynchronous Display Terminal Market Perspectives, and Intermediaries' Requirements for Asynchronous Display Terminals.

The report determined that price is the major issue in this market as vendors continue to standardize on features and terminal intelligence capabilities.

**ASYNCHRONOUS DISPLAY TERMINAL MARKET**  
**VOLUME I:**  
**ASYNCHRONOUS DISPLAY TERMINAL MARKET PERSPECTIVES**

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## I INTRODUCTION





## I INTRODUCTION

### A. PURPOSE AND SCOPE

- This report was prepared by INPUT as a custom study for IBM Systems Communication Division, Kingston, New York.
- It is an update and in-depth extension of previous studies done by INPUT for IBM in March 1978 and March 1979, examining key areas of the CRT terminal market.
- The objective of this study is to determine the size and growth of the ASCII asynchronous display terminal market by interviewing (a) the leading vendors of this type of equipment and aggregating their nonproprietary shipment data for 1980 and 1981, and (b) buying organizations that reside in the distribution chain between the terminal manufacturer and the ultimate end user.
- The scope of this study is limited to asynchronous display terminals using the ASCII character set.
- This report is published in two volumes.
  - Volume I, Asynchronous Display Terminal Market Perspectives, presents INPUT's analysis of the results of interviews with display terminal manufacturers.

- Volume II, Intermediaries' Requirements for Asynchronous Display Terminals, describes intermediaries' perspectives of the marketplace.
- In Volume I, four major perspectives are developed:
  - Industry structure - including the distribution framework, the pricing levels within the distribution channels, and terminal function differentiations.
  - Vendor perspectives - including major strategies, the sources of supply, and the industry coverage by major vendor.
  - Outlook - including product trends, pricing trends, the timing of major changes in product or pricing, and the impact of other products.
  - Industry statistics - including a nine-year chart of shipments (1978-1986) by functional differentiation, as well as current percentages along the various distribution channels.
- Volume II discusses the product requirements of systems integrators and distributors with regard to asynchronous display terminals.
  - In the asynchronous display terminal marketplace, at least six intermediary buying organizations exist and, for purposes of this study, IBM limited it to two, Systems Integrator (SI) and Value-Added Distributor (VAD), which are defined as:
    - Systems Integrator (SI): A company that purchases display terminals for inclusion in its product or system. This company may or may not manufacture some of its own hardware but most likely adds its own software thereby orienting the system to a particular industry. The system is directed toward the general data processing marketplace.



- Value-Added Distributor (VAD): A company that buys display terminals in bulk quantities from the terminal manufacturer and resells them to the ultimate end user. Value is added by the provision of maintenance service, by the availability of leasing plans or other financing services, and by making the terminals available from stock, providing immediate availability, if required.
- This study analyzes the intermediaries':
  - Applications.
  - Hardware used and typical configurations.
  - End users served.
    - Industry.
    - Geographic constraints.
    - Company size - sales/employees/etc.
  - Purchasing process.
    - Evaluation procedures.
    - Price and brand sensitivity.
  - Service requirements.
  - Product requirements.
    - Functions.

- . Size.
- . Human factors.
- . Reliability.
- . Response time.
- View of the future.
  - . Expansion to new areas.
  - . Outlook for asynchronous displays.
  - . Competition.
  - . New product developments and timing.

## **B. RESEARCH AND METHODOLOGY**

- This study began with on-site planning meetings between IBM Systems Communication Division staff and INPUT staff in Harrison, New York; Saddle Brook, New Jersey; and Kingston, New York.
- Three questionnaires were developed by INPUT and approved by IBM Systems Communication Division to be used as the basis for interviewing the major asynchronous display terminal vendors, systems integrators, and value-added distributors.
  - A total of 43 interviews were conducted, as follows:

.	Display manufacturers	12
.	Systems integrators	20
.	Value-added distributors	<u>11</u>
		43

- The names of the companies interviewed and the titles of the interviewees are listed in Appendix A which appears in Volume I.
- Results of these primary interviews were verified by checking logical consistency of reported figures, comparing various published data, and by supplementary interviews with industry knowledgeable sources.
- Results have been aggregated and shuffled in such a way as to preserve anonymity and confidentiality of sources. In particular, it should be noted that respondents referred to as A,B,C, etc., are shuffled from one exhibit to the next.
- All conclusions should be construed to be the best opinion of INPUT, based on the cumulative effect of the data and analysis described above.
- Chapter II of Volume I and Chapters III and IV of Volume II contain the substance of the oral presentation of findings as delivered to IBM staff at Kingston on December 11, 1981, and constitute the major portion of the final report of this study.





## II INTERMEDIARIES' REQUIREMENTS: SUMMARY AND OPINION





## II INTERMEDIARIES' REQUIREMENTS: SUMMARY AND OPINION

### A. CONCLUSIONS

- Pricing of asynchronous display terminals at competitive levels that will enable intermediaries to sell them to end users at a reasonable profit is the key factor in determining a vendor's success in marketing to intermediaries.
  - In INPUT's opinion, the evidence supporting this conclusion is overwhelming.
    - Historically, market share at the Level 1 terminal subsector has followed the price leader. Since by definition the Level 1 terminal has no features that can serve to differentiate one competitor's product from another, price is the major attribute by which intermediaries can distinguish one vendor's products from those of competitors.
    - As the next two chapters of this report show, a terminal's price is considered important by both systems integrators and distributors with respect to current and future terminal selection criteria.
  - INPUT also believes that vendors of Level 2 terminals have effectively standardized the sets of features offered to the point where product

differentiation through features has virtually been eliminated, thereby leaving price again as the major marketing factor.

- The Level 3 and 4 product sector represents the only remaining opportunity to differentiate product sufficiently on a feature basis to justify wide variations in pricing, but the viability of this approach seems limited to five years or less. No historical justification exists to warrant a more optimistic posture.
  - . Within five years, most features will be standard offerings or options available at converging prices.
- Given today's prices of \$650 and \$695, respectively, which competitors are charging for Level 1 and Level 2 display terminals, vendors must be prepared to achieve manufacturing costs of approximately \$240 and \$255 per unit respectively if operating margins are to be maintained on single unit sales, and 30% to 40% lower if competitive volume discounts are to be offered.
  - Alternatively, vendors must be prepared to accept significantly lower operating profit margins if they wish to remain competitive.
  - Another strategic alternative is to base a range of asynchronous display terminals on a set of components that can be upgraded to Level 4 characteristics, but which can be configured as Level 1 or Level 2 terminals. Lower gross margins on such low performance level configurations could be offset by higher prices on Level 3 and 4 configurations to (hopefully) realize reasonable profit margins on the total program.
- A strategic concern that IBM must address is the likelihood that competitive asynchronous display terminals might provide a less costly alternative to the IBM 3270 subsystem.
  - In December 1981, Protocol Computers Inc. (PCI) of Woodland Hills, California, announced a product called the PCI 1076 which permits up

to 32 asynchronous display terminals to emulate IBM 3270 displays operating under the SNA/SDLC protocol.

- . This product has a purchase price of up to \$7,000. The company estimates that an end user can save up to \$2,000 per station by using a PCI 1076 protocol converter and 32 Level 1 ASCII terminals in place of IBM 3278 displays.

## **B. INTERMEDIARIES' ATTITUDES AND REQUIREMENTS**

- Neither the systems integrators nor the distributors interviewed provided any meaningful industry or application specialization information.
  - INPUT believes that industry and application specialization data supplied by systems integrators merely reflect random successes in obtaining contract awards.
- Purchasing patterns and vendor delivery patterns for intermediaries appear to be fairly similar.
  - Where the intermediary orders terminals in sufficiently large quantities - in lots of 100 units or more each year - the tendency is to place orders on an annual basis and to take delivery of a specific number of units according to a contractual schedule.
  - Distributors who purchase 70 or less units per year, and systems integrators who order 20 or less annually, place their orders on a monthly basis.
  - As might be expected, larger (in terms of revenue) intermediaries can commit to annual order volumes while smaller intermediaries tend to purchase on the basis of short-term requirements.

- Terminal selection criteria ranked as being of more than average importance are reliability, maintenance, and price.
  - Systems integrators also rank ergonomics and human factors as having greater than average importance. The terminal component represents a minor proportion of the total system, but since the terminals represent the interface that the system presents to the end user, it is important that the end user not develop an antipathy toward the interface.
  - To distributors, the manufacturer's identity and reputation are of above average importance. Distributors wish to handle the products of reputable manufacturers, and express a legitimate concern that the manufacturer has made a commitment to the marketplace.
- Price is one of the two top priorities systems integrators and distributors assign to terminal selection criteria.
  - Systems integrators also mention reliability, since they are likely to assume responsibility for maintenance at the customer's site. Excessive maintenance requirements are deleterious to systems integrators' operating costs.
- Terminal features ranked highest by both systems integrators and distributors are ambient light reflection characteristics, a separable keyboard, and screen size.
  - Customers rarely specify that the display screen be glare-free, but quickly recognize that glare and reflections are, at best, annoying.
  - Separability of the keyboard is generally thought to be a desirable feature, as this feature is viewed as a space saver and as something that makes the terminal easier to work with.



- However, in certain applications a nondetachable keyboard is preferred. Intermediaries have found that customers in the education sector are likely to report thefts of separable keyboards.
- While most respondents identify a 12-inch CRT with 24 or 25 80-character lines as standard, the Digital Equipment VT-100 with its 132-character line is identified by some as the most popular terminal available.
  - The value of the 132-column width is that it permits the display of line printer report formats without the necessity of horizontal scrolling.
  - In word processing applications, the ability to see a complete 66-line page is important.
  - The Xerox 8011 and 8012 NS processors are being marketed as devices capable of functioning as both word and data processors in an Ethernet-based 8000 Network System. Equipped with a 10" x 12.8" area of usable display space (approximately 16" along the diagonal), these products provide a bit map of 809 x 1,024 pixels (picture elements), which is more than adequate to provide full text page displays as well as high-resolution monochrome graphics.
  - Some intermediaries believe that an attachment, which would permit projection of the display on a large monitor, would be desirable.
- Systems integrators are more likely to provide on-site maintenance of terminals, while distributors generally tend to provide depot maintenance.

- Systems integrators consider software control, high-resolution graphics, and color graphics as important display terminal options. Distributors consider a printer face, large screens, and reverse video options to be important.
  - INPUT believes that distributors' responses reflect immediate needs, while systems integrators, who are surrogate systems engineers, are more likely to be longer term oriented.
- Factors that are likely to cause a systems integrator to consider using a vendor's terminals are price, features, and reliability/maintainability. Distributors most commonly consider price, features, and performance, and the manufacturer's reputation.
- Over the next five years, systems integrators look for greater availability of high-resolution graphics and local intelligence, while distributors anticipate more features, lower prices, computing capability, and better software.
- From the preceding observations, as well as from the detail presented in the next two chapters, price appears most frequently as a factor in selection of terminals, in considering the use of additional terminals, and in intermediaries' expectations of future trends.
  - Pricing, therefore, is key to maintaining a competitive posture in the asynchronous display terminal marketplace.
- Exhibit II-1 is a summary of intermediaries' most frequent observations about major asynchronous display terminal attributes, from which INPUT's conclusions were drawn.
  - The next two chapters discuss the topics shown on the exhibit.
    - These two chapters report the findings of the study which lead to the conclusions that INPUT has drawn.

# EXHIBIT II-1

## INTERMEDIARIES' REQUIREMENTS FOR ASYNCHRONOUS DISPLAY TERMINALS

ATTRIBUTE	INTERMEDIARY	
	SYSTEMS INTEGRATORS	DISTRIBUTORS
Industry Specialization	Not Meaningful	
Purchase and Delivery Patterns	<p>Larger intermediaries tend to place volume orders (100 or more units) on an annual basis, and to take partial deliveries on a monthly basis.</p> <p>Intermediaries who buy in smaller lots (70 or less for distributors, 20 or less for systems integrators) order monthly and take delivery monthly.</p>	
Terminal Selection Criteria:		
Ranking	Reliability Maintenance Price Ergonomics	Reliability Price Manufacturer Maintenance
Priority	Reliability Price	Manufacturer Price
Terminal Features	Ambient Light Reflection Separable Keyboard Screen Size	Ambient Light Reflection Separable Keyboard Screen Size
Maintenance	Usually on site, by the manufacturer and/or the systems integrator	Usually depot maintenance, distributor usually performs
Options	Software Control High Resolution Graphics Color Graphics	Printer Interface Large Screen Reverse Video
Enticing Factors	Price Features Reliability	Price Features and Performance Manufacturer
Future Trends	High Resolution Graphics More Local Intelligence	More Features Lower Prices Computing Capability Better Software



### III THE SYSTEMS INTEGRATOR PERSPECTIVE- SURVEY RESULTS





### III THE SYSTEMS INTEGRATOR PERSPECTIVE - SURVEY RESULTS

#### A. RESPONDENT PROFILE

- INPUT interviewed 20 systems integrators, three of whom identified themselves as being distributors in addition to performing systems integration functions.
  - Ten stated that their operations were international in scope.
  - Seven operate nationally in the United States, while three provide regional service.
  - The distribution of systems integrators interviewed by size, in terms of 1981 actual or estimated revenues, as well as by estimated 1982 revenues, is shown in Exhibit III-1. 1981 revenues range from \$60 million to \$0.6 million, while 1982 estimates are from \$80 million to \$1 million. Seven respondents declined to project 1982 revenues.
- 1982 personnel estimates range from 1,200 to 16 employees, with anticipated revenue per employee averaging roughly \$120,000 within a range of \$188,000 to \$56,000.
- Industry or application specialization is fairly diverse, and is as shown in Exhibit III-2.

# EXHIBIT III-1

## DISTRIBUTION OF SYSTEMS INTEGRATOR RESPONDENTS BY SIZE IN TERMS OF REVENUES, 1981-1982

REVENUE RANGE	NUMBER OF RESPONDENTS	
	1981	1982
Over \$20 Million	4	6
\$20 Million - \$10 Million	5	1
\$ 9 Million - \$ 5 Million	4	2
\$ 4 Million - \$ 1 Million	6	4
Under \$1 Million	1	0

## EXHIBIT III-2

## INDUSTRY SPECIALIZATION BY SYSTEMS INTEGRATORS

INDUSTRY OR APPLICATION	RESPONDENTS	
	NUMBER	PERCENT
Government (State, Local, Federal)	5	25%
Financial/Accounting/Brokerage	4	20
Distribution	2	10
Legal	2	10
Communications	1	5
Computer-Aided Dispatching	1	5
Construction	1	5
Data Acquisition	1	5
Mailing Lists	1	5
Market Research	1	5
Medical	1	5
Personnel	1	5
Power Utilities	1	5
Process Control	1	5
Publishing	1	5
Software	1	5
Training Systems	1	5

- No meaningful combinations of applications were found. INPUT believes that where systems integrators responded with more than one area of specialization, the responses reflected the integrators' historical success in obtaining development contracts.

## B. PURCHASING PROCESS

### I. SYSTEMS INTEGRATORS' PURCHASING POLICIES

- Seven systems integrators tend or desire to deal with only one vendor for the hardware which they integrate into a system, while the balance stated that they generally tend to deal with several hardware vendors.
  - INPUT feels that this is a reflection of size, with the smaller integrators needing to limit their exposure to one vendor.
  - Vendors mentioned as exclusive suppliers were Data General, Data-point, Digital Equipment, Hewlett-Packard, and Vector Graphics.
  - No meaningful correlations could be drawn from the application specialization of the respondent and the equipment used, with some exceptions. The respondent who uses Vector Graphics hardware exclusively states that he specializes in small business applications and systems for commodity traders.
  - One respondent who specializes in banking applications uses either an all-Digital Equipment system or an all-IBM system.
- Those dealing with one vendor per system stated that they did so because of the related convenience. They are below \$5 million in revenues, and their small size probably has a bearing on their perception of convenience.

- Others stated that the primary reason for using only one hardware vendor is that it simplifies the delivery of maintenance as far as the user is concerned: it avoids "finger-pointing" when a component fails.
- One respondent stated that he deals with one vendor exclusively because of his position as an OEM distributor for the vendor's hardware, as a result of which he can purchase the hardware at an OEM discount.
- Systems integrators believe that display terminals should be considered differently from other system components; i.e., the CPU, storage devices, and printers.
  - Ten of the thirteen who felt this stated that they dealt with more than one hardware vendor in configuring the system.
- Systems integrators believe that display terminals are an important part of the system.
  - They are important for an application's specific requirements and for ease of use. Cost, appearance, features, flexibility, user interface requirements, and software requirements are also important.
  - Two who thought that terminals were not important said terminals have no particular significance beyond the fact that they are necessary parts of the system, just as CPUs, power supplies, and cabling are necessary parts of the system. Another reflected that terminals are not particularly important to the systems integrator, although the user may think differently.
- Fifteen of the systems integrators placed the value of the terminal complements at 15% or less of the total system value (five apiece valued the complements at 1%-5%, 6%-10%, and 11%-15%).

- On average, terminal complements represent 10% of the value of the systems placed.
- Exhibit III-3 shows how individual respondents' sourcing of display terminals relates to the sourcing of central processors for the systems they configure.
- INPUT believes it significant that only one systems integrator chooses IBM asynchronous display terminals, and that this is done only when the CPU selected is an IBM product. This particular vendor specializes in turnkey systems for the banking industry, and configures either all-Digital Equipment or all-IBM systems.
  - This particular systems integrator probably believes that by limiting the hardware choices to the equipment manufactured by companies whose shares of common stock are generally considered to be investment grade quality, and therefore recognizable to banks' senior management, his marketing obstacles are reduced.
- No significance could be attached to the range of prices that systems integrators mentioned for their systems. The lowest price mentioned was \$2,200 and the highest \$5 million or more. Individual price ranges varied widely, and all stated that the price depended on the configuration installed.
- Exhibit III-4 shows that 85% of systems integrator respondents deal with the display manufacturer directly, either exclusively or some of the time.
- Price/volume distributors are used at least sometimes by 35% of the respondents, reflecting the importance of price.
- Twelve respondents cited price as the major reason for acquiring terminals from vendors, whether the vendors or the manufacturers are volume distributors.



# EXHIBIT III-3

## CORRELATION OF CPU AND TERMINAL SOURCING

RESPONDENT	CPU SOURCE	DISPLAY TERMINAL SOURCE
A	DEC	DEC
B	DEC/IBM	DEC/IBM
C	DEC/Harris/Honeywell/IBM	DEC/Hazeltine/Lear Siegler
D	DEC/IBM	Lear Siegler
E	DEC/Hewlett-Packard/Medcomp	Lear Siegler/ADDS
F	DEC/Others	Depends on Application
G	Data General	Data General
H	Data General/Honeywell	Data General
I	Data General/Ontel	Data General/Ontel
J	Data General	TeleVideo
K	Hewlett-Packard	Hewlett-Packard
L	Hewlett-Packard	Visual Technology
M	IBM	Lear Siegler
N	Datapoint	Datapoint
O	Vector Graphics	Vector Graphics
P	Sperry/Qantel/Digilog	Sperry/Qantel/Digilog
Q	Digidyne	Zentec
R	Intel	Mostek Keyboard, Various Monitors
S	Own Design	TeleVideo/RCA
T	Several	Several

EXHIBIT III-4

SOURCE OF TERMINALS PURCHASED BY  
SYSTEMS INTEGRATORS

SOURCE	PERCENT OF RESPONDENTS
Manufacturer Only	65%
Manufacturer and/or Price Volume Distributor	20
Price/Volume Distributor Only	15
Value-Added Distributor	0

- System software for systems configured by integrators is supplied wholly or partially by the CPU manufacturer for 40% of the respondents and wholly or partially by the systems integrator for 60% of the respondents. This is shown in Exhibit III-5. All respondents provide the applications software.

## 2. PURCHASE AND DELIVERY PATTERNS

- As seen in Exhibit III-6, systems integrators who purchase asynchronous display terminals in quantities of 100 or more units per year generally place their orders on an annual basis.
- Generally, vendors ship the terminals to the systems integrators according to a predetermined schedule.
- INPUT believes that the larger systems integrators buy in quantity to take advantage of volume discounts, while the smaller firms purchase terminals in smaller lots on an as-needed basis.

## 3. DISPLAY TERMINAL SELECTION PROCEDURES

- Systems integrators were asked to rank seven criteria according to their importance to the process of selecting asynchronous display terminals, on a scale of 1 to 5 where 1 means very important and 5 represents not important.
  - According to this ranking scheme, several criteria may be assigned equal rank. The objective of this was to establish what criteria were considered important, without regard to the sequence in which they are considered. (Sequencing of criteria was addressed in another question, the results of which are discussed below: in this, systems integrators were asked to order the same criteria in the sequence that they are considered when terminals are selected.)
  - Average rankings of the seven criteria are shown in Exhibit III-7.

EXHIBIT III-5

SOURCE OF SYSTEM SOFTWARE

SOURCE	PERCENT OF RESPONDENTS
Systems Integrator	50%
CPU Manufacturer	30
Systems Integrator and CPU Manufacturer	10
Other Vendor	10

## EXHIBIT III-6

## PURCHASE AND DELIVERY PATTERNS FOR SYSTEMS INTEGRATORS

SYSTEMS INTEGRATORS' ORDERING PATTERNS			VENDORS' DELIVERY PATTERNS	
RESPONDENT	AVERAGE ORDER SIZE (UNITS)	ORDER PERIOD	NUMBER OF UNITS	SHIPPING INTERVAL
A*	2,400-3,600	Annually	200-300	Monthly
B	500	Annually	As Needed	As Needed
C	400	Annually	As Ordered	Monthly
D	200-300	Annually	As Ordered	As Ordered
E	200-300	Annually	As Ordered	As Ordered (With CPU)
F	200	Annually	As Ordered	As Ordered
G	175	45 Ordered Each Quarter	As Ordered	As Ordered
H	150	Annually	150	45-60 ARO
I*	100	Annually	10	Monthly
J	100	Annually	As Ordered	As Ordered
K	20	Bimonthly	10	Monthly
L	12-15	Monthly	12-15	Monthly
M	32	Annually	As Ordered	As Ordered
N	4	Monthly	4	Monthly
O*	3	Monthly	3	Immediately
P	6	Irregular	6	60 ARO
Q	2-3	Monthly	2-3	Immediately
R	2	Monthly	2	120 ARO
S	20	Annually	As Ordered	As Ordered
T	10	Annually	As Ordered	As Ordered

\* THESE RESPONDENTS IDENTIFIED THEMSELVES AS BOTH SYSTEMS INTEGRATORS AND DISTRIBUTORS

EXHIBIT III-7

RANKING OF TERMINAL SELECTION CRITERIA  
BY SYSTEMS INTEGRATORS

CRITERION	AVERAGE RANK *
Reliability	1.4
Maintenance	1.7
Price	1.8
Ergonomics/Human Factors	1.9
Display Manufacturer	2.6
Response Time	3.3
Terminal Size	3.6

\* 1 = VERY IMPORTANT, 5 = NOT IMPORTANT



- The averages were computed by multiplying every ranking of 1 by one, every ranking of 2 by two, and so on. The products were then added up, and the sum divided by the number of rankings to obtain the average rank. Thus, if there were five responses with three assigning a rank of 1 and two assigning a rank of 5, the average was computed as follows:

$$\text{Average} = ( (3 \times 1) + (2 \times 5) ) \div 5 = 2.6$$

- Reliability, maintenance, price, and ergonomics averaged rankings of more than moderate importance. (Specifics of ergonomic characteristics are discussed below.)
- The identity of the display terminal manufacturer is of slightly more than average importance, while response time and terminal size were assigned less than average importance.
- Systems integrators were then asked to assign priorities to these terminal selection criteria by indicating the sequence in which the criteria are considered. The average priorities for each criterion are presented in Exhibit III-8.
  - The calculation of averages was limited only to explicit priority answers, assigning a value of 1 to every priority 1 answer, through 7 to every priority 7 answer.
    - The reliability of the terminal being considered has the highest priority.
    - The price of the terminal has a higher priority than the identity of the display manufacturer.

EXHIBIT III-8

PRIORITY ASSIGNMENT OF  
TERMINAL SELECTION CRITERIA  
BY SYSTEMS INTEGRATORS

CRITERION	AVERAGE PRIORITY
Reliability	1.7
Price	1.9
Display Manufacturer	2.5
Ergonomics/Human Factors	2.8
Maintenance	2.9
Terminal Size	5.6
Response Time	5.7

- Exhibit III-9 shows that 50% or more of the time systems integrators do not assign any priority to price, the display manufacturer, response time, or terminal size.
  - . In some cases, the universe of vendors that a systems integrator considers for display terminals shrinks considerably when the CPU is selected.
  - . Other factors, such as the end user's choice, OEM relationships, and the absence of any pecuniary interest in the selection of a specific manufacturer's terminals effectively reduce the number of criteria that a systems integrator must consider in selecting the display terminals for a system.
- Systems integrators' perceptions of the relative importance of ergonomics and maintenance reflect their concern with user satisfaction as regards operations of turnkey systems. Systems integrators seek to meet end-users' needs. If the end user is uncomfortable with the equipment and is unhappy with the service he gets, the systems integrator's reputation suffers.
- Exhibit III-10 lists the frequency of mentions for other influences on the selection process for display terminals.
  - Reliability and maintainability were reemphasized, and price was reiterated.
  - Mention was made of arbitrary factors, including corporate policy, executive fiat, and customer fiat.
- Exhibit III-4 showed that 85% of the systems integrators purchase their terminals directly from the terminal manufacturer, either exclusively or some of the time, and 15% acquired terminals from volume distributors only.

# EXHIBIT III-9

## TERMINAL SELECTION CRITERIA PRIORITIES FOR SYSTEMS INTEGRATORS

CRITERION	PRIORITY									
	1	2	3	4	5	6	7	NO PRIORITY	NO RESPONSE	
Display Manufacturer	3	1	2	1	1	0	0	11	1	
Price	2	5	2	0	0	0	0	10	1	
Reliability	6	4	2	0	0	0	0	7	1	
Terminal Size	0	0	0	0	1	2	0	16	1	
Response Time	0	1	0	0	0	0	3	15	1	
Maintenance	0	6	2	2	0	1	0	8	1	
Ergonomics/Human Factors	3	3	2	2	2	0	0	7	1	

## EXHIBIT III-10

OTHER INFLUENCES ON DISPLAY TERMINAL SELECTION  
MENTIONED BY SYSTEMS INTEGRATORS

INFLUENCE	RESPONDENTS	
	NUMBER	PERCENT
Reliability /Maintainability	5	25%
Senior Management of Systems Integrator Firm	4	20
Customer Requirement or Choice	3	15
Systems Engineer's Recommendation	3	15
Vendor's Reputation	3	15
Corporate Policy: Deal With One Vendor Only	3	15
Price	2	10
Ease of Programming	1	5
Ergonomics/Human Factors	1	5
Features	1	5
Customer Selection From Systems Integrator's Inventory	1	5

- Sixty percent mentioned price as the primary reason for acquiring terminals from the source identified.
  - In some cases, they could purchase sufficient quantities from the manufacturer to qualify for a volume discount.
  - In other cases, they felt that their purchase volumes were too low to qualify for a volume discount, but the manufacturer's prices for low-volume orders were comparable to those charged by volume distributors.
- Integrators believe that convenience, service, and technical support are primary reasons for dealing with the supplier indicated.
- Eighty-five percent indicated a preference for buying directly from the manufacturer because of price alone or price in combination with service support. The other 15% purchased terminals in such low volumes that they preferred to purchase from a volume distributor, who they said offered them better prices than the manufacturers.
- Thus, despite the fact that systems integrators identify other factors as being important in selecting display terminals, it seems clear that price is one of the most important factors.

### C. PRODUCT REQUIREMENTS

- Systems integrators ranked screen size, detachable keyboards, and ambient light reflection characteristics as somewhat important. A blinking cursor and reverse video were ranked as being of average importance.
- Average rankings of nine ergonomic features are shown in Exhibit III-11 along with related comments.



# EXHIBIT III-11

## RELATIVE IMPORTANCE OF TERMINAL FEATURES TO SYSTEMS INTEGRATORS

FEATURE	AVERAGE RANK*	RESPONDENTS' COMMENTS
Screen Size	2.3	<ul style="list-style-type: none"> <li>● 11" x 12" Is Popular</li> <li>● 24 x 80 Characters Is Standard</li> <li>● "Large" Is Preferred</li> <li>● 132 Character Width Is Desirable</li> </ul>
Separable Keyboard	2.3	<ul style="list-style-type: none"> <li>● Preferred Because it Is a Space Saver</li> <li>● Not Always Important</li> </ul>
Ambient Light Reflection	2.3	<ul style="list-style-type: none"> <li>● Ability to See Is Important</li> <li>● Importance Becomes Apparent After Customer Begins Using the Terminal</li> </ul>
Blinking Cursor	2.5	<ul style="list-style-type: none"> <li>● Easy to Distinguish From Underline Character</li> </ul>
Reverse Video	2.7	
Tilt and Swivel	3.1	
Audibility of Keystroke	3.1	
Phosphor Color	3.2	
Cursor Type	3.3	

\* 1 = VERY IMPORTANT, 5 = NOT IMPORTANT

- . Average rankings were computed by assigning a value of n to each ranking n of a feature within the range of 1 to 5, where 1 represents most important and 5 not important, adding up the value of n, and dividing the sum by the number of responses. Thus, where there were five respondents, two of whom assigned a rank of 5 to a characteristic and three assigned a rank of 1 to the same characteristic, the average rank was computed as follows:

$$\text{Average} = ( (2 \times 5) + (3 \times 1) ) \div 5 = 2.6$$

- . The desirability of a line width of 132 characters reflects the popularity of the Digital Equipment VT-100 Level 1 terminal, on which both 80 and 132 character widths are standard and switch selectable. Apparently the 132 character width is useful in applications where a program developer wishes to view the format of a report destined for a line printer, or when a user wishes to look at summary pages of a multipage report.
- . The preference for a "large" screen has reference to a 60-line terminal, which is perceived as useful in word processing applications (some display terminal vendors attempt to market combination word and data processor equipment). Additionally, when a 132-character line is available, there is an incentive to seek the ability to display a full page of printer output rather than a partial page display.
- . Separable keyboards are generally preferred except by one respondent who specializes in, among others, systems for sale to public educational institutions, where separable keyboards tend to disappear.

- Ambient light reflection characteristics are described as something that an end user does not specify, but about which he will complain if the characteristics are found to be annoying.
- Factors that would induce systems integrators to consider using another vendor's display terminals when configuring a system are listed in Exhibit III-12.
  - Attractive pricing would be favorably received by 60% of the study's systems integrator respondents.
  - Additional features, particularly color and/or graphics, would be attractive to 45%.
  - Reliability and maintainability are important to 40% of systems integrator respondents.
  - Compatibility, which would be an enticing factor to 20% of the respondents, refers specifically to the capability to emulate the Digital Equipment VT-100 terminal.
- Other characteristics identified as important to systems integrators in selecting a display terminal are:
  - General characteristics of availability and self-diagnostic capability.
  - Screen characteristics of clarity and cursor control.
  - Keyboard characteristics including upper and lower case character sets and special function keys.
  - Transmission characteristics including support of polling and block transmission.

# EXHIBIT III-12

## FACTORS ENHANCING ATTRACTIVENESS OF ASYNCHRONOUS DISPLAY TERMINALS TO SYSTEMS INTEGRATORS

FACTOR	RESPONDENTS	
	NUMBER	PERCENT
Price	12	60%
Expanded Features	9	45
- Color		
- Graphics		
Reliability/Maintainability	8	40
Compatibility	4	20

- Exhibit III-13 shows the options that systems integrators believe are important today and will be important five years from today.
  - As the exhibit shows, systems integrators are quite specific as regards options that are important today. The responses likely reflect current marketing requirements for the respondents.
    - The Greek character set mentioned by one respondent is deemed important in engineering and scientific applications.
  - Over the next five years, software control - i.e., more local intelligence - as well as high resolution graphics and color graphics will be important options.
    - As systems integrators work very closely with end users, INPUT believes that systems integrators' opinions are highly reflective of longer term end-user needs. Close collaboration with end users on systems development tends to give systems integrators a better feel for the end user's longer term objectives than a value-added distributor, whose perspective is generally limited to the short to intermediate term.

#### D. SERVICE REQUIREMENTS

- Systems integrators tend to depend on the manufacturer of the display terminals to provide service.
  - Exhibit III-14 shows that the maintenance of equipment placed by 85% of systems integrator respondents is wholly or partially performed by the terminal manufacturer.

EXHIBIT III-13

SYSTEMS INTEGRATOR OPINIONS  
ON IMPORTANCE OF OPTIONS  
(Number Of Mentions)

OPTION	IMPORTANT	
	TODAY	HIGHER IN 1986
High-Resolution Graphics	1	5
Color Graphics	1	5
Letter-Quality Printer	1	-
Hard Copy Without Printer	1	-
Greek Character Set	1	-
APL Character Set	-	1
Special Function Keys	1	-
Upper and Lower Case	1	-
Detachable Keyboard	-	1
"Zoom" Feature	-	1
Graphics to Support CAD/CAM	-	2
Voice Response	-	2
Storage Capability	-	1
Software Control	-	6



## EXHIBIT III-14

## TERMINAL HARDWARE MAINTENANCE RESPONSIBILITY

MAINTAINER(S)	RESPONDENTS	
	NUMBER	PERCENT
Manufacturer and Systems Integrator	8	40%
Terminal Manufacturer Only	5	25
Manufacturer and Third Party	4	20
Systems Integrator and Third Party	2	10
Systems Integrator Only	1	5

- As shown in Exhibit III-15, the terminal manufacturer is likely to provide on-site maintenance for 45% of the systems installed by respondents and depot maintenance, exclusively or in conjunction with on-site maintenance, for 15% of the systems integrators.
- Other services provided by systems integrators are listed in Exhibit III-16.
  - User training, programming, and equipment installation are the most common.
  - Additional services performed by some systems integrators are leasing, field service coordination, site planning, and post-installation follow-up.

#### E. SYSTEMS INTEGRATORS' VIEW OF THE FUTURE

- Systems integrators were invited to express their perceptions of how the next five years will unfold, first as regards their specific needs, and second with respect to the market for asynchronous display terminals in general.
- Exhibit III-17 shows their opinions of how they anticipate their terminal needs will change over the next five years.
  - While feature enrichment is predominant, systems integrators are specific about what features they will need - high resolution graphics, more intelligence at the terminal, and special features, as listed in Exhibit III-17.
    - Since by definition the Level 1 terminal has no features, the conclusion that can be drawn from these responses is that systems integrators' needs for Level 1 terminals will be declining over the 1981-1986 period in favor of the Levels 2, 3, and 4 terminals.

EXHIBIT III-15

TERMINAL HARDWARE MAINTENANCE RESPONSIBILITY  
AMONG SYSTEMS INTEGRATORS

MAINTAINER(S)	HOW PROVIDED					TOTALS	
	DEPOT ONLY	ON-SITE ONLY	BOTH	VARIES	DO NOT KNOW	NUMBER	PERCENT
Manufacturer and Systems Integrator	0	4	1	2	0	7	35%
Manufacturer	0	4	0	0	3	7	35
Manufacturer and Third Party	0	0	2	1	0	3	15
Systems Integrator and Third Party	1	0	1	0	0	2	10
Systems Integrator Only	0	1	0	0	0	1	5
Total: Number	1	9	4	3	3	20	-
Total: Percent	5%	45%	20%	15%	15%	100%	100%

# EXHIBIT III-16

## OTHER SERVICES PROVIDED BY SYSTEMS INTEGRATORS

SERVICE	RESPONDENTS	
	NUMBER	PERCENT
End-User Training	16	80%
Programming	12	60
Installation	6	30
Systems Analysis	3	15
Consultation	2	10
Documentation	2	10

## EXHIBIT III-17

### HOW SYSTEMS INTEGRATORS' TERMINAL PRODUCT NEEDS WILL CHANGE OVER THE NEXT FIVE YEARS (Number Of Mentions)

- Variety of Products (1)
- High Resolution Graphics (5)
- Audio Response (1)
- More Local Intelligence (3)
- Graphic Input ("Writing Pads") (1)
- Terminals for Specialized Applications
  - Greek Characters for Engineering and Scientific Applications (1)
  - APL Character Set (1)
  - 126-Character Line (1)
- Color and Black and White Printers (1)
- Touch Sensitive Keys and Panels (1)
- Light Pens (1)

- Systems integrators' perceptions of general industry trends are listed in Exhibit III-18.
  - Once again, systems integrators' perceptions of general market trends point to their expectation of a declining market share of shipments for Level 1 terminals.
  - One expressed the opinion that personal computers will not encroach upon the market for Level 3 and Level 4 terminals because they address a different set of needs: the systems orientation of terminals and the standalone nature of personal computers are viewed as requiring different product strategies.
- Vendors perceived as likely to become dominant asynchronous display terminal suppliers within the next five years include:
  - Applied Digital Data Systems.
  - Datamedia.
  - Digital Equipment Corporation.
  - IBM.
  - TeleVideo.
  - Texas Instruments.
  - Visual Technology.
- With respect to systems integrators' perceptions of IBM as a participant in this market, the following two opinions are of interest.



EXHIBIT III-18

SYSTEMS INTEGRATORS' PERCEPTIONS  
OF MARKET SECTOR TRENDS,  
1981-1986

- Non-intelligent terminals will still be useful as simple input devices - also, users lack the sophistication to use personal computers.
- Microprocessors seen as vehicles for increasing function and flexibility.
- Integration of diskettes and rigid disks into terminals
- Personal computers will not affect the marketplace adversely
- High resolution graphics and color graphics will become available at lower cost

- One feels that IBM is trying to establish a leadership position in the asynchronous display terminal market, but is not willing to project that IBM will attain such a position.
- Another expresses the opinion that IBM does not have the proper mindset to compete successfully in a market characterized by high-volume manufacturing, mass marketing and distribution, and low margins.
  - . The fact that this systems integrator himself does not purchase terminals in large quantities does not, in INPUT's opinion, impugn the validity of the observation. The respondent is in regular contact with the market's distribution channels.
- Price is the primary determining factor in causing a systems integrator to select a terminal, assuming that the reliability of a lower priced display is as good as the display being purchased.
  - . Price differences under 10% are not considered very significant when the system is configured to include just a few terminals.
  - . A 15% price differential is deemed enough to occasion a reappraisal of display terminal selection procedures. Price differentials in excess of 15% would receive very serious consideration.
- Systems integrators generally believe that Japanese vendors will be important suppliers of asynchronous display terminals over the next five to ten years.
- It was felt that all Japanese manufacturers will enter the U.S. market eventually, but are biding their time until the market is large enough to allow the Japanese to capitalize on their traditional strengths (high-volume production and mass marketing).

- Nippon Electric Co. (NEC) was the only Japanese manufacturer mentioned by name.
- Some are of the opinion that Japanese competitors are more likely to offer more features than they are to cut prices, because of a perceived difficulty in further reducing the costs of manufacturing Level 1 terminals.
- Another, however, believes that Japan's leadership in robotics will give Japanese manufacturers an edge in manufacturing cost reductions in the area of non-electronic components.
- The systems integrator interviewed who had the greatest revenue, who identifies himself as both a systems integrator and a distributor, thinks that only ADDS, which has recently opened a new manufacturing facility in Utah that is capable of producing one million displays a year, will be capable of withstanding a Japanese onslaught.



#### IV THE DISTRIBUTOR PERSPECTIVE- SURVEY FINDINGS





#### IV THE DISTRIBUTOR PERSPECTIVE - SURVEY FINDINGS

##### A. RESPONDENT PROFILE

- Eleven distributors were interviewed. Of these, eight identify themselves as distributors, while three are both distributors and systems houses.
- Geographic areas served by the respondents are as follows:

- International	1
- United States (national)	2
- U.S. East Coast	2
- U.S. Northeast	1
- U.S. Midwest	2
- U.S. Rocky Mountain states	2
- No response	1
- Five respondents provided fiscal year 1981 actual or estimated revenues ranging from \$30 million to \$5 million, and are distributed as follows:

- Over \$20 million 2
- \$20-\$10 million 1
- \$9-\$5 million 2
- Eight respondents furnished fiscal year 1982 revenue estimates in the \$50 million-\$5 million range, as follows:
  - Over \$20 million 2
  - \$20-\$10 million 3
  - \$9-\$5 million 3
- 1982 personnel estimates range from 10 to 125+, with anticipated revenue per employee averaging \$340,000 within a range of \$769,000 to \$115,000.
- Industry specialization is unimportant. Sixty-four percent of the respondents do not cater to any specific industry. The balance rated the following areas of specialization:
  - Data transmission.
  - Energy.
  - Graphics.
  - Systems integrators.

## B. PURCHASING PROCESS

### I. TERMINALS MOST FREQUENTLY MENTIONED

- Exhibit IV-1 lists the vendors whose terminals were mentioned most frequently by distributors.
  - Digital Equipment, Hazeltine, Datamedia, and Lear Siegler were most frequently mentioned. Applied Digital Data Systems, IBM, and Perkin-Elmer were each mentioned twice.
    - Note: Perkin-Elmer no longer markets display terminals on an independent basis, as the company's experience showed that the rate of return on sales would remain below levels that corporate management was willing to accept.
- The number of terminal models carried by a distributor ranges from one to seven or more.
  - 5 or more models                      3 distributors
  - 5-2 models                              7 distributors
  - 1 model                                  1 distributor
- Distributors carrying five or more product lines provided insight into the reasons for the diversity in their inventories.
  - They want to offer the widest possible choice to their customer base.
  - They wish to maximize their gross potential customer base.

EXHIBIT IV-1

VENDORS WHOSE TERMINALS  
ARE CARRIED BY DISTRIBUTORS

VENDOR NAME	NUMBER OF RESPONDENTS
Digital Equipment Corporation	6
Hazeltine	5
Datamedia	4
Lear Siegler	4
Applied Digital Data Systems	2
IBM	2
Perkin-Elmer	2

- They believe it is a marketing advantage, offering price/performance and functional alternatives.
- Those carrying two to five product lines cite the following:
  - They attempt to be responsive to customer demand.
  - The variety is in keeping with their role as manufacturers' representatives.
  - They stock the most popular models with price/performance attributes.
- One distributor who stocked only Datapoint terminals said he did so because he felt that Datapoint's products were the "Cadillacs of the line," which INPUT felt was an interesting observation.
- Two of the three distributors carrying five or more product lines anticipate 1982 sales of \$20 million or more. The third is projecting revenues in the \$9-\$5 million range.
- Distributors ranked eight selection parameters on a scale of 1 (very important) to 5 (not important). They were free to assign any ranking to any parameter.
  - Exhibit IV-2 shows the average of these rankings in descending order of importance. Reliability, price, vendor, and maintenance were ranked as quite important.
- Similarly, distributors assigned priorities to these parameters on the same scale. The results are shown in Exhibit IV-3.
  - Exhibit IV-4 shows the averages of these priorities. On average, the manufacturer's identity and price had the highest average priorities.

## EXHIBIT IV-2

### RANKING OF TERMINAL SELECTION CRITERIA BY DISTRIBUTORS

CRITERION	AVERAGE RANK *
Reliability	1.4
Price	1.5
Display Manufacturer	1.8
Maintenance	1.9
Response Time	2.9
Ergonomics/Human Factors	3.2
Terminal Size	3.4
Financing	3.7

\* 1 = VERY IMPORTANT, 5 = NOT IMPORTANT



# EXHIBIT IV-3

## TERMINAL SELECTION CRITERIA PRIORITIES FOR DISTRIBUTORS

CRITERION	PRIORITY								
	1	2	3	4	5	6	7	8	NO RESPONSE
Display Manufacturer	6	2	0	0	2	0	0	0	1
Price	3	5	0	1	1	0	0	0	1
Reliability	1	1	6	1	0	1	0	0	1
Terminal Size	0	0	1	1	2	3	1	0	3
Response Time	1	0	1	0	2	1	1	2	3
Maintenance	1	1	1	5	1	0	0	1	1
Ergonomics/Human Factors	0	0	0	0	1	0	4	3	3

EXHIBIT IV-4

PRIORITY ASSIGNMENT OF  
TERMINAL SELECTION CRITERIA  
BY DISTRIBUTORS

CRITERION	AVERAGE PRIORITY
Display Manufacturer	2.0
Price	2.2
Reliability	3.1
Maintenance	3.9
Terminal Size	5.3
Response Time	5.4
Ergonomics/Human Factors	5.6
Financing	7.1

- Computation of average ranks and priorities was performed as described in Chapter III.
- As contrasted with systems integrators, whose selection of terminals sometimes depends on system or other factors, distributors sell only a component of a system.
  - The manufacturer's identity is important to the distributor because some customers specifically ask for terminals by name and because distributors wish to handle products of reputable manufacturers.
  - The price a distributor pays to the vendor has a direct relationship to the distributor's profitability.

## 2. PURCHASE AND ORDER PATTERNS

- The average number of terminals ordered by a distributor from any single vendor ranges from 10 to 30 units per month to 2,000 units per year, as shown in Exhibit IV-5.
  - Six distributors indicated that the period over which vendors shipped products is one month. Two replied that vendors' shipments are on-going, while one stated that vendor shipments are in line with his orders.
- The average volume discount for orders in the quantities identified was 25% within a range of 15% to 40%.
  - Some distributors indicated that discounts they receive of 25% to 35% are better than the manufacturers' standard discount at the specified order volume, while others either do not know or are unwilling to respond.

# EXHIBIT IV-5

## PURCHASE AND DELIVERY PATTERNS FOR DISTRIBUTORS

RESPONDENT	DISTRIBUTORS' ORDERING PATTERNS		VENDORS' DELIVERY PATTERNS		DISTRIBUTORS' TYPICAL CUSTOMER ORDER (UNITS)
	AVERAGE ORDER SIZE (UNITS)	ORDER PERIOD	NUMBER OF UNITS	SHIPPING INTERVAL	
A	2,000	Annually (Ongoing)	75-80	Biweekly	5-10
B	125	Monthly	125	Monthly	100
C	Ongoing	(Ships Approx. 2,000 a Year)			3-4
D	500	Annually	40	Monthly	1-20
E	500	Annually	40	Monthly	1-20
F	70	Monthly	70	Monthly	3
G	30-50	Monthly	30-50	Monthly	4
H	10-30	Monthly	10-30	Monthly	10

- One respondent claims that he makes more profit selling Ann Arbor terminals at list price (he buys them at a 20% discount) than he does selling other terminals he purchases at 48% off list price and sells at a 14% markup.
- The typical order received by distributors from their customers ranges from 1 to 20 units (although one indicated a typical order size of 100 units).
- Typical customer order size showed no correlation with any other data provided by distributors.

### C. PRODUCT REQUIREMENTS

- Exhibit IV-6 shows, in descending order of importance, distributors' perceptions of the relative importance of asynchronous display terminal characteristics with regard to their value in selling the product to an end user. The features were ranked on a scale of 1 (very important) to 5 (not important), and the averages are shown in the exhibit.
- Ambient light reflection characteristics, a separable keyboard, and screen size were ranked highest, as was the case for systems integrators. As the exhibit shows, however, the range of the averages is small, and no one characteristic really stands out as being much more important than any others.
- Other features or characteristics identified as important in selling to an end user were:
  - Availability (three mentions).
  - One mention each of:

# EXHIBIT IV-6

## RELATIVE IMPORTANCE OF TERMINAL FEATURES TO DISTRIBUTORS

FEATURE	AVERAGE RANK *
Ambient Light Reflection	1.9
Separable Keyboard	2.0
Screen Size	2.1
Blinking Cursor	2.2
Tilt and Swivel	2.2
Reverse Video	2.4
Phosphor Color	2.5
Cursor Type	2.5
Audible Keystroke	2.7

\* 1 = VERY IMPORTANT, 5 = NOT IMPORTANT

- . Application.
  - . Edit capability.
  - . Protected formats.
  - . Page size and number available; i.e., how many sets of data that can be displayed on the screen can be stored in local (terminal) memory.
- Comments on the way in which product characteristics are important are listed in Exhibit IV-7.
- Options most frequently purchased currently are shown in Exhibit IV-8, along with the number of distributors so indicating, and the number who believe these options will increase in importance over the next five years.
- Only two options were mentioned as declining in importance over the next five years:
  - . Parallel access ports.
  - . Number of pages of memory.

#### D. SERVICE REQUIREMENTS

- As shown in Exhibit IV-9, maintenance of equipment sold by distributors is usually provided by the distributor and/or a third-party maintenance organization.
- Depot maintenance is most common, as only one distributor provides on-site maintenance only.



## EXHIBIT IV-7

### DISTRIBUTORS' COMMENTS ON IMPORTANCE OF TERMINAL FEATURES AND SELECTION FACTORS

Screen Size (1 Mention)	<ul style="list-style-type: none"><li>● Large Size Preferred, Especially For Graphics Applications</li></ul>
Separable Keyboard (2 Mentions)	<ul style="list-style-type: none"><li>● Important to Many</li></ul>
Price (2 Mentions)	<ul style="list-style-type: none"><li>● Often Major Determinant</li></ul>
Maintenance (3 Mentions)	<ul style="list-style-type: none"><li>● Ease of Maintenance Is Usually More Important Than Price</li><li>● User Generally Stocks Spares</li></ul>
Display Manufacturer (2 Mentions)	<ul style="list-style-type: none"><li>● Deal Only With Reputable Manufacturers</li><li>● Customers Specifically Ask For Brand Names</li><li>● Manufacturer's Commitment and Resources Are Important</li></ul>

## EXHIBIT IV-8

## DISTRIBUTOR OPINIONS ON IMPORTANCE OF OPTIONS

OPTION	TODAY		IN 1986	
	NUMBER	PERCENT	NUMBER	PERCENT
Printer Interface	5	45%	4	36%
Large Screen	4	36	0	0
Reverse Video	2	18	1	9

## EXHIBIT IV-9

## TERMINAL MAINTENANCE RESPONSIBILITY

MAINTAINER	HOW PROVIDED			TOTALS	
	DEPOT ONLY	ON-SITE ONLY	BOTH	NUMBER	PERCENT
Distributor Only	-	1	3	4	36%
Distributor and Third Party	1	-	2	3	27
Manufacturer and Distributor	1	-	1	2	18
Manufacturer Only	1	-	-	1	9
All Three	1	-	-	1	9
Total: Number	4	1	6	11	-
Total: Percent	36%	9%	55%	100%	100%

- Only one depends exclusively on the manufacturer for maintenance.
- Other services provided by distributors are shown in Exhibit IV-10. All distributors in this study provide installation services, and over half provide training, leasing plans, and rental plans for their customers.
- Financial services provided by distributors are tabulated in Exhibit IV-11.

#### E. ADDITION OF ANOTHER MODEL TO DISTRIBUTORS' INVENTORY

- Distributors were asked what three factors might entice them to add another brand of display terminal to their inventories.
  - Price, features and performance, and the manufacturer's reputation were mentioned most frequently.
  - Responses are tabulated in Exhibit IV-12.

#### F. DISTRIBUTORS' VIEW OF THE FUTURE

- Distributors expect asynchronous display terminals to provide higher performance at lower cost over the next five years. Responses to a question soliciting their opinion on dominant trends in this product area are shown in Exhibit IV-13.
  - More features, lower prices, and computing capability were most frequently mentioned.

# EXHIBIT IV-10

## OTHER SERVICES PROVIDED BY DISTRIBUTORS

RESPONDENT	INSTALLATION	TRAINING	CUSTOMIZE	OTHER-
A	Yes	Yes	Yes	No
B	Yes	Yes	Yes	No
C	Yes	Rarely	Rarely	No
D	Yes	Rarely	Rarely	No
E	Yes	Yes	No	No
F	Yes	Not Needed	Rarely	No
G	Yes	Yes	Yes	No
H	Yes	Yes	Yes	No
I	Yes	No	Yes	No
J	Yes	Yes	No	No
K	Yes	Yes	No	Yes (Software)
Total*: Number	11	9	8	1
Total*: Percent	100%	82%	73%	9%

\* NUMBER RESPONDING YES

# EXHIBIT IV-11

## FINANCIAL SERVICES PROVIDED BY DISTRIBUTORS

RESPONDENT	INSTALLMENT PURCHASE	LEASING	RENTING
A	Yes	Yes	Yes
B	Yes	Yes	Yes
C	Yes	Yes	Yes
D	Yes	Yes	Yes
E	Rarely	Yes	Yes
F	No	Yes	Yes
G	No	No	Yes
H	No	No	No
I	No	No	No
J	No	No	No
K	No	No	No
Total*: Number	5	6	7
Total*: Percent	45%	55%	64%

\* NUMBER RESPONDING YES

EXHIBIT IV-12

FACTORS ENHANCING ATTRACTIVENESS  
OF ASYNCHRONOUS DISPLAY TERMINALS  
TO DISTRIBUTORS

FACTOR	RESPONDENTS	
	NUMBER	PERCENT
Price	7	64%
Features, Performance	6	55
Manufacturer's Reputation	5	45
Reliability	2	18
Graphics	2	18



EXHIBIT IV-13

DISTRIBUTORS' PERCEPTIONS  
OF MARKET SECTOR TRENDS,  
1981-1986  
(Number Of Mentions)

- More Features (5)
- Lower Prices (3)
- Local Computing Capability (3)
- Better Software (2)
- Larger Screens (1)
- 132 Columns (Characters) Per Line (1)
- Tilt Screens (1)
- Nondetachable Keyboard (1)

- The distributor who foresees a trend to a 132-character line width noted that Digital Equipment's VT-100 is the most popular terminal of those he carries.
- One distributor believes that demand will increase for attachments that will enable displayed data to be projected on a large monitor screen.
- As might be expected, distributors were virtually unanimous in projecting an expanded role for distributors over the next five years in the marketplace for asynchronous display terminals. Specific reasons cited were that distributors can continue to provide:
  - More competitive prices.
  - A wider selection of alternative product choices.
  - Better support and maintenance than are generally available from a vendor.
- Opinion was divided as to whether or not personal computers would be sold in place of intelligent displays.
  - Six distributors believe that this will not occur. Those supplying reasons provided the following statements:
    - "Intelligent terminals will become personal computers."
    - "Personal computers are aimed at the hobbyist, to whom low cost is a very important consideration. Personal computers are therefore too limited for business users."
    - "Personal computers will be capable of supporting multiple nonintelligent ASCII terminals by 1985."

- Four distributors think that personal computers will compete with intelligent displays. Related comments were:
  - . "IBM will compete with Apple."
  - . "Increasing, but no impact on us yet."
  - . "Personal computers will be very prominent in the next three years, but don't know after that."



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